

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

POWER INTEGRATIONS, INC., a
Delaware corporation,

Plaintiff,

v.

FAIRCHILD SEMICONDUCTOR
INTERNATIONAL, INC., a Delaware
corporation, and FAIRCHILD
SEMICONDUCTOR CORPORATION, a
Delaware corporation,

Defendants.

C.A. No. 04-1371 JJF

PUBLIC VERSION

**DECLARATION OF SEAN P. HAYES IN SUPPORT OF
POWER INTEGRATIONS' RESPONSIVE CLAIM CONSTRUCTION BRIEF**

I, Sean P. Hayes, declare as follows:

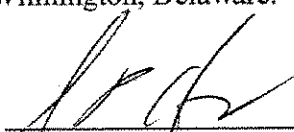
1. I am an associate of Fish & Richardson P.C., counsel of record in this action for Plaintiff Power Integrations, Inc. ("Power Integrations"). I am a member of the Bar of the State of Delaware. I have personal knowledge of the matters stated in this declaration and would testify truthfully to them if called upon to do so.
2. Attached as Exhibit A is a copy of the Opening Expert Report of Mike Shields on Infringement (with exhibits reproduced in color).
3. Attached as Exhibit B are excerpts from a copy of S.M. Sze, *Physics of Semiconductor Devices* (2d Ed.).
4. Attached as Exhibit C are excerpts from the deposition of Fairchild employee Gary Dolny, taken October 13, 2005.
5. Attached as Exhibit D is a copy of the Rebuttal Expert Report of Mike Shields on Validity.
6. Attached as Exhibit E is a copy of the Opening Expert Report of Robert Blauschild on Infringement.

7. Attached as Exhibit F is a copy of the Rebuttal Expert Report of Robert Blauschild on Validity.

8. Attached as Exhibit G is a copy of a December 13, 1999 office action from the prosecution history of the Power Integrations '851 patent.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 17th day of January, 2006, at Wilmington, Delaware.



Sean P. Hayes

CERTIFICATE OF SERVICE

I hereby certify that on January 25, 2006, I electronically filed with the Clerk of Court Public Version of the Declaration of Sean P. Hayes In Support of Power Integrations' Responsive Claim Construction Brief using CM/ECF which will send electronic notification of such filing(s) to the following Delaware counsel.

Steven J. Balick, Esq.
John G. Day, Esq.
Ashby & Geddes
222 Delaware Avenue, 17th Floor
P. O. Box 1150
Wilmington, DE 19899

I hereby certify that on January 25, 2006, I have mailed by United States Postal Service, the document(s) to the following non-registered participants:

Bas de Blank
Duo Chen
Orrick, Herrington, Sutcliffe LLP
1000 Marsh Road
Menlo Park, CA 94025

/s/ Sean P. Hayes
Sean P. Hayes (Hayes@fr.com)

A

EXHIBIT REDACTED
IN ITS ENTIRETY

B

Physics of Semiconductor Devices

2nd Edition

S.M. Sze

ET

MOSFET Structures

489

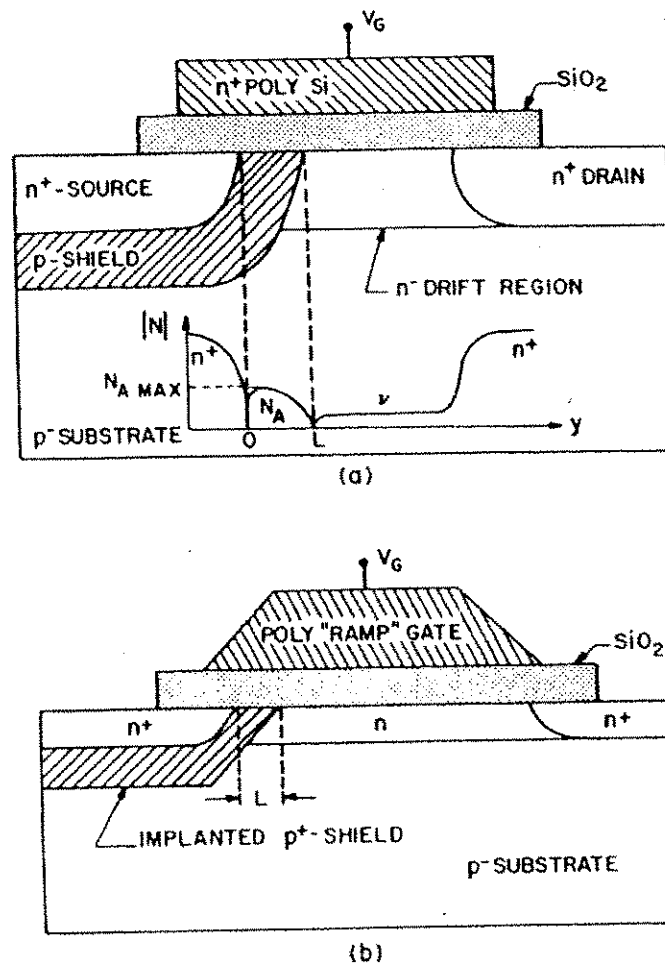


Fig. 53 (a) DMOS. (b) DIMOS structure. (After Tarui, Hayashi, and Sekigawa, Ref. 57; Tihanyi and Widmann, Ref. 58.)

8.5.3 DMOS

Figure 53a shows the DMOS (double-diffused MOS) structure,⁵⁷ where the channel length L is determined by the higher rate of diffusion of the p -dopant (e.g., boron), compared to the n^+ -dopant (e.g., phosphorus) of the source. The channel is followed by a lightly doped drift region. Figure 53a also shows the doping profile along the semiconductor surface. Another version of DMOS is made by implantation. DIMOS (double-implanted MOS)⁵⁸ forms its source and drain by using a polysilicon gate as mask. The gate is tapered and the p^+ -shield region is shaped by implantation through the tapered gate. The DIMOS structure improves the control in DMOS structures.

The DMOS and DIMOS structures can have very short channels and do not depend on a lithographic mask to determine channel length. Both

FCS0000556

structures have good punch-through control because of the heavily doped p -shield. The lightly doped drift region minimizes the voltage drop across the region by maintaining a uniform field ($\geq 10^4$ V/cm) to achieve velocity saturation.⁵⁹ The field near the drain is the same as in the drift region, so avalanche breakdown, multiplication, and oxide charging are lessened, compared to conventional MOSFETs and HMOSs.¹¹

However, the threshold voltage V_T is more difficult to control in DMOS.⁶⁰ As shown in Fig. 53a, V_T is determined by the maximum doping concentration $N_{A\max}$ along the semiconductor surface. Varying $N_{A\max}$ leads to variations in V_T . The localization of punch-through control to a thin p^+ -shield region requires a higher doping level compared to HMOS, which leads to poorer turn-off behavior for DMOS.

8.5.4 Recessed-Channel MOSFET

The insert of Fig. 54 shows a MOSFET with a recessed channel.⁶¹ The junction depth r_j for this structure is zero or negative. Figure 35 of Section 8.4 showed that the minimum channel length decreases as $r_j^{1/3}$. Figure 54 demonstrates that by reducing r_j , short-channel effects are minimized. For a given oxide thickness and substrate doping, as r_j decreases the onset of a large drop of V_T occurs at progressively shorter channels.

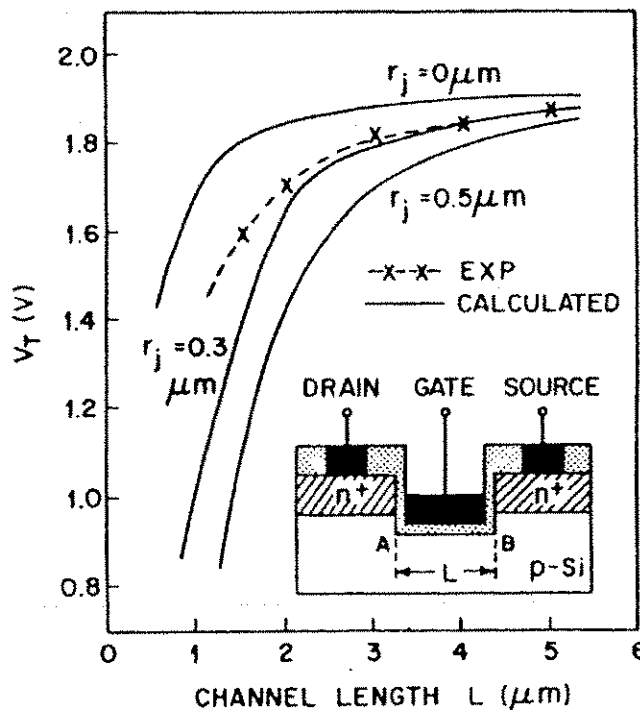


Fig. 54 Calculated and experimental V_T versus L plot for various junction depths. Insert shows a recessed-channel MOSFET. (After Nishimatsu et al., Ref. 61.)

Fig
dev
62.

mi
th
Al
in

re
sc
F
m
ci

ir

C

**EXHIBIT REDACTED
IN ITS ENTIRETY**

D

EXHIBIT REDACTED
IN ITS ENTIRETY

E

EXHIBIT REDACTED
IN ITS ENTIRETY

F

**EXHIBIT REDACTED
IN ITS ENTIRETY**

G



UNITED STATES DEPARTMENT OF COMMERCE
 Patent and Trademark Office
 Address: COMMISSIONER OF PATENTS AND TRADEMARKS
 Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/080,774	05/18/98	BALAKIRSHNAN	B 233/248

MM22/1213

LYON & LYON
 FIRST INTERSTATE WORLD CENTER
 633 W FIFTH STREET 47TH FLOOR
 LOS ANGELES CA 90071

EXAMINER

ZWEIZIG, J

ART UNIT	PAPER NUMBER
----------	--------------

2816

DATE MAILED:

12/13/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/080,774	App. Serial Balakrishnan et al.
	Examiner Jeffrey Zwolsig	Group Art Unit 2818

☒ Responsive to communication(s) filed on 11/8/99

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 463 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-37 is/are pending in the application.

Of the above, claim(s) 11-28 is/are withdrawn from consideration.

☒ Claim(s) 1-3, 7, 8 & 10 is/are allowed.

☒ Claim(s) 4-6, 9 & 29-37 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☒ The proposed drawing correction, filed on 11/8/99 is ☒ Approved ☐ Disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(a).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

Application/Control Number: 09/080,774

Page 2

Art Unit: 2816

Election/Restriction

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

Group I: claims 1-10 & 29-37 directed toward a PWM circuit with a frequency variation circuit; and

Group II: claims 11-28 directed toward a PWM circuit with a soft start circuit.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claims are generic. Applicants have elected, without traverse, Group I: claims 1-10 & 29-37. Claims 11-28 have been withdrawn from consideration.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4-6, 9 & 29-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

FCS0000437

Application/Control Number: 09/080,774

Page 3

Art Unit: 2816

In claim 4 lines 2 & 3, "a magnitude of said oscillation signal" should be changed to --said magnitude of said oscillation signal--.

In claim 9 line 8, "pulse width modulated switch" should be changed to just --switch-- (see claim 1 line 4).

In claim 9 line 9, the second occurrence of "first winding" should be changed to --second winding--.

Referring to the phrase "said first [second] winding capable of being coupled to a load", it is not understood if the winding is or is not coupled to the load.

In claim 29, the phrase "that provides a drive signal for a maximum time period of a time duration signal" is not understood. If the drive signal were applied for the maximum period of the duration, the drive signal would always be applied.

In claim 35 line 8, "regulation circuit" should be changed to just --switch-- (see claim 29 line 4).

In claim 35 line 9, the second occurrence of "first winding" should be --second winding--.

Referring to the phrase "said first [second] winding capable of being coupled to a load", it is not understood if the winding is or is not coupled to a load.

Claims 4, 9, 29 & 35 are indefinite. Claims 5, 6 & 30-37 are rejected as being dependent on an indefinite intervening claim.

FCS0000438

Application/Control Number: 09/080,774

Page 4

Art Unit: 2816

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 29, 35 & 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicants' Prior Art Fig. 1.

Applicants' Prior Art Fig. 1 shows a first terminal 95, a second terminal Com, a switch/drive circuit 90 and a frequency variation circuit 140 as recited in claim 29.

Further shown is a rectifier 10, a capacitor 15, a first winding 35 and a second winding 45 as recited in claim 35.

Further shown is a feedback terminal (Error Amplifier in) as recited in claim 37.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

FCS0000439

Application/Control Number: 09/080,774

Page 5

Art Unit: 2816

7. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Prior Art Fig. 1.

Applicants' Prior Art Fig. 1 does not specify that the circuit is an integrated circuit as recited in claim 34. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Prior Art Fig. 1 as an integrated circuit for the benefit of implementing a compact single package. Claim 34 is obvious.

Allowable Subject Matter

8. The prior Art of record does not appear to disclose or suggest a PWM switch comprising an oscillator for generating a maximum duty cycle signal and a signal with a frequency range dependent on a frequency variation circuit as recited in claim 1.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Zweizig whose telephone number is (703) 305-7243. The examiner can normally be reached on Monday through Friday from 7:00 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Callahan, can be reached on (703) 308-4876. The fax phone number for this Group is (703) 308-7722.

FCS0000440

Application/Control Number: 09/080,774

Page 6

Art Unit: 2816

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

JZ

December 13, 1999


Jeffrey Zweizig

Patent Examiner

Art Unit 2816

FCS0000441

Notice of References Cited		Application No. 09/080,774		Applicant Balakrishnan et al.	
		Examiner Jeffrey Zweisig		Group Art Unit 2818	
				Page 1 of 1	

U.S. PATENT DOCUMENTS						
	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	
A			None			
B						
C						
D						
E						
F						
G						
H						
I						
J						
K						
L						
M						

FOREIGN PATENT DOCUMENTS						
	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						

NON-PATENT DOCUMENTS	
	DOCUMENT (including Author, Title, Source, and Patent Pages)
U	
V	
W	
X	

FCS0000442